worked at the opening up of the Yenisei and the Siberian seas, which culminated in his ever-memorable voyage, accomplishing the North-east Passage in 1878–79. The voyage of the *Vega* is still fresh in the minds of all. Leaving Tromsö on July 21, she rounded East Cape on July 18, 1879, less than twelve months afterwards. The *Vega* found the Kara Sea free; and since that sea was so favourable, a considerable time was spent on dredging, sounding, and other scientific observations, including the re-mapping of the coast-line between Yenisei and Cape Sterlegof. Ice and bad weather detained him at Tainia Bay, but on August 19, the *Vega* rounded the northernmost point of Asia, Cape Chelyuskin. Next day the *Vega* was further north, namely, 77° 45′ N., which proved to be the most northerly point reached. At the Lena Delta, the *Lena*, which accompanied the *Vega* so far, turned southward up the river, and Nordenskjöld continued his voyage toward Bering Strait. On September 12, progress was stopped at the "North Cape" of Cook, where he turned back to Bering Straits in 1778, and Nordenskjöld was forced to winter off Pitlekai in 67° 07′ N., 123° E. Systematic scientific observations were carried on during the whole winter, spring, and following summer, till on July 19 they were released, and two days later rounded the eastern extremity of Asia with flying colours. On September 2, 1879, Nordenskjöld dropped anchor at Yokohama, whence the whole civilised world received the news that this man had accomplished what had so often been attempted during three centuries. For this brilliant exploit, Nordenskjöld was awarded a magnificent reception throughout Europe, and many honours were showered upon him, including his elevation to the rank of Baron in the Swedish Peerage. It is from the complete and striking success of this expedition that Nordenskjöld became popularly world-renowned.

In 1883 he undertook a second expedition to Greenland, penetrating further into the interior than any other explorer.

His success rested on the solid basis of his scientific instinct and training, and of his indomitable will and courage. It is to him that we owe the first real efforts at undertaking scientific research in the Polar regions, especially from the geological and mineralogical aspects.

His researches outside the Polar regions were also important. He discovered uranium in many varieties of coal, and he showed that fresh water could be obtained anywhere in Scandinavia at a depth of 100 feet through the Archæan rocks. This has been proved in 400 cases to be correct, and has been of great advantage to pilots, fishermen, lighthouse keepers, &c., living on small islands without water, and also for many factories. He remained a politician all his life. On account of refusing to suppress his opinions in this direction, he was rejected in 1867 as a candidate for the chair of mineralogy and geology in Helsingfors University, although he was unanimously recommended. As the son of a Swedish nobleman, he sat and voted in the Swedish House of Nobles; but, although so intimately associated with Sweden for the greater part of his life, he always referred to Finland as his "dear Fatherland." In his latter days he interested himself in South Polar exploration, and it must have been pleasing to him to know that his nephew was about to lead an expedition to the Antarctic regions.

W. S. BRUCE.

NOTES.

THE appointment of the Royal Commission on Tuberculosis was announced in Tuesday's *Gazette*. The Commission is composed of Sir Michael Foster, K.C.B., F.R.S., Prof. G. S. Woodhead, Prof. S. H. C. Martin, Prof. J. McFadyean, and Prof. R. W. Boyce. It is appointed to inquire and report with respect to tuberculosis:—(1) Whether the disease in animals and man is one and the same; (2) whether animals and man can be reciprocally infected with it; and (3) under what conditions, if at all, the transmission of the disease from animals to man takes place, and what are the circumstances favourable or unfavourable to such transmission.

THE International Engineering Congress was opened at Glasgow on Tuesday with an address by the president, Mr. James Mansergh, F.R.S. Referring to the value of the work of settling standard sections of important constructive materials, Mr. Mansergh remarked that this matter had been taken in hand by a joint committee of the Institution of Civil Engineers, the Institution of Mechanical Engineers, the Institution of Naval Architects, and the Iron and Steel Institute. Sir Benjamin Baker, with a specially-selected sub-committee, had charge of bridge and general building construction; Sir John Barry, with similar assistance, of railways; Mr. Denny, of shipbuilding; and Sir Douglas Fox, of rolling-stock. In the hands of these eminent engineers the work would be well handled. The address concluded with brief references to some of the chief subjects to be brought before the various sections of the congress. After the address members of the congress dispersed to the meeting rooms of their sections, where addresses were delivered by the sectional presidents, and papers were read.

THE forty-sixth general meeting of the German Geological Society will be held at Halle on October 4–7.

WE regret to announce that Dr. Charles Meldrum, C.M.G., F.R.S., late Director of the Royal Alfred Observatory, Mauritius, died on August 28 in his 80th year.

IT is stated that the exhibits of the German chemical industry at the Paris Exposition valued at 30,000*l.* have been presented to the Technological Institute of the University of Berlin.

THE Vienna correspondent of the *Times* states that the Emperor Francis Joseph has addressed an exceptionally cordial autograph letter to Prof. Edward Suess, the eminent Austrian geologist and politician, on his retirement from the Vienna University. The Emperor expresses his high appreciation of the work done by Prof. Suess in science, as an academic teacher, and as a public man, especially in the promotion of sanitary reform.

A TELEGRAM received by the American Consul at Christiania from the secretary of Mr. Baldwin's American Polar Expedition at Hammerfest, states that the Norwegian steamship *Frithjof*, which is one of the vessels employed by Mr. Baldwin, has returned to Hammerfest after fitting out and provisioning the expedition in Franz Josef Land. The expedition was landed at Cape Ziegler; when the *Frithjof* sailed from that point the conditions were favourable for pressing northwards, and Mr. Baldwin intended to begin his advance the next day.

THE Australasian Ornithologists' Union has been successfully inaugurated, and the first general meeting will be held at Adelaide in October or November. The objects of the Society are "the advancement and popularisation of the science of ornithology, the protection of useful and ornamental avifauna, and the editing and publication of a magazine or periodical, to be called *The Emu*, or such magazine or periodical as the Society may from time to time determine upon." Colonel W. V. Legge is the president-elect, and Mr. D. Le Souëf, Zoological Gardens, Melbourne, is the honorary secretary.

IN connection with the proposed Pasteur statue for Paris, the Paris correspondent of the *Chemist and Druggist* states that an attempt is being made to make it a national monument. The idea is that every Frenchman and resident in France should become a subscriber, and amounts from a halfpenny upwards

will be received. Subscription-lists have been distributed in large numbers amongst heads of business-houses, manufactories, and Government offices, inviting them to collect sums, however small.

THE New York correspondent of the *Times* reports as follows upon experiments made at Havana to test whether yellow fever is carried by mosquitoes:—"Out of eight persons bitten by infected insects three have died, three have the fever and will possibly recover, one is not affected, while as regards the remaining case it is too early to make a diagnosis. The physicians are shocked at the result of the experiments. It was supposed that direct infection from mosquitoes caused only a mild form of the disease, and was a safe means of making the subjects immune. It is now definitely known that a man bitten by an infected mosquito after being inoculated with the serum introduced by Dr. Caldas, a Brazilian expert, has developed a genuine case of fever."

MAJOR RONALD ROSS, F.R.S., has just returned to England rom West Africa, where he has been organising a campaign against mosquitoes and malaria. After inaugurating the campaign at Sierra Leone, Major Ross went to Lagos, where the Government actively concerns itself with all matters affecting the health of the community. In welcoming him to the colony, the Governor, Sir William Macgregor, referred to the measures taken to promote sanitary conditions, and thus increase the industrial prosperity of West Africa. Major Ross, in thanking His Excellency, said that he had been on the point of believing that his countrymen were becoming an unscientific and unpractical people. More than two years ago the fact that malarial infection is communicated by mosquitoes had been established by the most stringent scientific and experimental proof; and yet to his knowledge practically nothing had been done by his countrymen to act on this new information, in spite of its economic importance. He had, therefore, accepted with alacrity the offer of a large sum of money and other facilities from a generous philanthropist, and from Mr. A. L. Jones, Mr. John Holt, and others in England, to pay the expenses of practical work against malaria in Sierra Leone. This work had been commenced with every promise of success by his friend, Dr. Logan Taylor, and he had, therefore, felt himself free to proceed to Lagos to watch the work being done there. He was delighted to find that his pessimistic attitude was not justifiable as regards Lagos. He strongly eulogised everything that was being done against malaria by Sir William MacGregor, himself a distinguished member of the medical profession, by his most able friend, Dr. Henry Strachan, and by the enlightened medical profession and the Ladies' League in Lagos. He had witnessed the rapid and successful filling up of marshes by sand from the lagoons, and the rational utilisation of gaol prisoners for this useful work. He had inspected numerous houses rendered mosquito-proof by fine wire netting, which, while it did not exclude the breeze, as he expected it would, did exclude insects and damp, much to the comfort of the inmates. He highly commended the efforts of the Government to induce their officials and others to take quinine—a prophylactic which was much neglected in consequence of ignorance and faddism. Before the departure of Major Ross for Accra, Mr. C. Tambaci and other leading merchants promised to place an annual subscription of 150*l.* in the hands of the Governor to pay for a "Mosquito Brigade" for Lagos.

IN an address on tuberculosis given at the autumnal conference of the Sanitary Inspectors' Association last week, Sir James Crichton Browne referred to the subject of the relation between bovine and human tuberculosis, and Dr. Koch's recent statements upon it. In the course of his remarks, he said:—"Private investigations and experiments, laudable and significant enough though they might be, would not meet the requirements of the case, and the country was entitled to ask that a thoroughly competent public tribunal should, after a searching trial, determine whether the restrictions on trade that had been proved to be unnecessary should be abolished, or whether still more stringent restrictions than hitherto should be enforced to prevent human tubercular infection from animal sources. Dr. Koch had discredited the Report of the last Royal Commission on Tuberculosis, which up to now they had regarded as a standard work of reference; and it seemed highly desirable that the Report should be officially confirmed or declared to be obsolete." It was afterwards unanimously resolved:—"That this Association is of opinion that it is desirable that a Government inquiry should be instituted into the question as to the identity or the non-identity of human and bovine tubercle, and that a copy of this resolution be sent to the Right Hon. Walter Long, President of the Local Government Board."

READERS of NATURE are aware that kites carrying meteorological instruments have been employed for several years at the Blue Hill Observatory, Massachusetts, in the studies of the atmosphere carried on there. Until recently, no flights were made in winds having rates of less than twelve miles an hour; but Mr. A. L. Rotch, the Director of the Observatory, has now used the common method of creating an artificial wind and raising kites in comparatively calm weather by motion of the earth-end of the kite string or wire, the motion in this case being obtained from a rapidly moving tug. The apparatus employed consisted of a portable windlass containing 3600 feet of wire, three Hargrave kites having a total lifting surface of 80 square feet, and an instrument for recording temperature, pressure and wind velocity and humidity. This outfit was installed on the upper deck of a tug in Massachusetts Bay on August 22. Two flights were made, and the greatest heights reached were 2630 and 2670 feet. With more wire and kites much greater heights could have been obtained. The natural wind varied between six and eleven miles an hour, and was much too light to elevate the kites and apparatus, but by steaming against the wind the velocity relative to the tug and kites was increased to between fourteen and nineteen miles an hour. In this artificial wind the kites rose easily, and so steadily that they could be let out from and hauled into hand without the slightest risk to kites or instruments. The kites were very sensitive to alterations of the course of the tug, and began to fall whenever the course varied 30° to 50° on either side of the mean direction of the wind. The experiment shows that meteorological records at great heights may easily be obtained during calms or very light winds by means of kites flown from a rapidly moving steamer; and that it is now possible for the observer and student to work uninterruptedly under almost all conditions of wind and weather.

THE Kew *Bulletin of Miscellaneous Information* for November and December 1899 has just been received. In spite of its belated publication, several of the contributions to it are noteworthy. Of current interest is a paper on the two West Australian woods, jarrah (*Eucalyptus marginata*) and karri (*Eucalyptus diversicolor*), which are now largely used, especially for wood paving. Over nearly all the world, and more particularly in England, these woods are in increasing demand. A Department of Woods and Forests has now been established, and its general usefulness as regards the control and management of the enormous natural wealth of the timber resources of the colony is beginning to be recognised and appreciated. Something over one million acres of forest land have now been leased from the Government for the purpose of acquiring the timber upon them. This is chiefly jarrah country, and embraces some of the finest forests of that particular kind of tree, which is the principal timber-tree in Western Australia. There are other timbers in the forests which are equally, if not more, valuable for their

own special purposes, but for general constructive works, necessitating contact with soil and water, the timber of this tree stands foremost. The karri is not so well known as the jarrah owing to the limited area and, at present, comparative inaccessibility of its field of growth. It is the giant tree of Western Australia, if not of the whole Australian continent. For street blocking karri timber is most valuable, and for this purpose seems to be equal to, if not better than, the jarrah, in that its surface, by the wear caused by the traffic, does not render it so slippery for the horses' feet. As is well known, this timber is now largely used for London street paving.

SOME farmers believe that the moon has a direct effect upon vegetation, and that the time of sowing seeds should be regulated by the lunar phases. No accurate experiments appear to have been made to investigate this influence; and a note in the U.S. *Monthly Weather Review* points out that the belief is one that has come down to us from very early times, and began before accurate observations were recorded. Two proverbs relating to the influence of the moon upon vegetation, as handed down to us through folk-lore, read as follows:—

"Go plant the bean when the moon is light,
And you will find that this is right;
Plant the potatoes when the moon is dark,
And to this line you will hark."
(*Dunwoody, Weather Proverbs.*)

"Sowe peason and beans in the wane of the moone
Who soweth them sooner, he soweth too soone."
(*Werenfels, Dissertation upon Superstition*, 1748.)

Here are two different sayings as to the phase of the moon during which to plant: (1) a bright moon for beans and a dark moon for potatoes; (2) a waning moon for peas and beans. Another proverb states that sowings should always be made at the period of an increasing moon. Further astrological considerations are also often introduced, and if they were permitted to determine the time of planting seeds, farmers would find that there are only one or two full working days in a whole month when the moon and the signs are favourable. Fortunately, farmers as a class wisely busy themselves with seed-sowing when the soil (not when the moon) allows it, and have more faith in laborious cultivation, manure, rainfall and temperature than in lunar influence.

MR. J. HALL-EDWARDS, who was surgeon-radiographer to the Imperial Yeomanry Hospital, South Africa, described some of his experiences as to the value of Röntgen rays in warfare at the recent meeting of the British Medical Association. He found that the plan of obtaining the current for charging the accumulators from a dynamo connected with a belt to a foot motor of the bicycle type was altogether impracticable, as no one could work the bicycle arrangement long enough to be of much use. A small oil engine was used instead of the foot power, and worked very satisfactorily. As to the results of the introduction of Röntgen rays into military surgery, Mr. Hall-Edwards remarks:—"With the friendly aid of these rays, we are enabled to record the effects of small-bore projectiles under the various conditions which occur in actual warfare. We are enabled to localise the position of a bullet or other foreign body with absolutely scientific accuracy; and, if our present knowledge be used to its fullest extent, we can see the condition of the parts as plainly as we could do were the soft tissues composed only of transparent gelatine. These facts being recognised, it is easy to see that the application of the rays to military surgery must produce results of the greatest possible value for future guidance, and that their complete application in a great war—such as we are at present engaged in—must prove of inestimable service in increasing our knowledge upon this most important subject. Many of the time-worn, useless and dangerous methods of finding the whereabouts of hidden bullets may now be forgotten; for with these rays we have at our disposal an aseptic, scientific and absolutely accurate method of localisation, which may be improved, but which even now is as near perfection as our present knowledge can make it. There can be little doubt that, in the face of the new facts brought to light by means of these rays, military surgery will have to be rewritten, and the advance made will mark an epoch in its progress."

"I RETURNED, and saw under the sun, that the race is not to the swift, nor the battle to the strong," wrote the wise man. Writing in the same prophetic vein, M. J. de Bloch in the current *Contemporary Review*, and Mr. H. G. Wells in the *Fortnightly* for September, depict in graphic colours the transformation which the immediate future will witness in the methods of warfare. Both writers are convinced that the military tactics of the past are irretrievably dead. The effective soldier of the future will be a man whose capacity for individual action has been cultivated and developed. The day for all the picturesque accompaniments of war is done, and exhibitions of mere brute courage will be of no avail. Mr. Wells takes into account the resources which modern science has made available for the business of war, and proceeds to anticipate the most likely directions that future advances will take. Of one thing he leaves his reader in no doubt, victory is bound to be with the nation that most sedulously attends to the education of its people in the scientific method. The great war of the future will be fought by citizens familiar with destructive instruments of precision, who have learnt to utilise all the accessory helps which science is gradually perfecting. There will be few professional military men of the type of to-day in the ranks of the victorious nation. In Mr. Wells's words, "the warfare of the coming time will really be won in schools and colleges and universities, wherever men write and read and talk together. The nation that produces, in the near future, the largest proportional development of educated and intelligent engineers and agriculturists, of doctors, schoolmasters, professional soldiers, and intellectually active people of all sorts; the nation that most resolutely picks over, educates, sterilises, exports, or poisons its People of the Abyss; . . . the nation in a word, that turns the greatest proportion of its irresponsible adiposity into social muscle, will certainly be the nation that will be the most powerful in warfare as in peace."

WE have received a report by Prof. Elster on progress in the study of Becquerel rays, reprinted from Dr. Eder's photographic *Jahrbuch* for 1901. It is a summary of experimental work done in this direction subsequent to the report by the same author for the previous year.

A REPRINT from the *Proceedings* of the South London Entomological Society contains a paper on the ova of Lepidoptera, by Mr. F. Noad Clark. Mr. Clark has been highly successful in photographing these eggs, especially when account is taken of the difficulty of obtaining good photographs of opaque microscopic objects.

FROM the annual *Report* for 1900 we learn that the Botanical Exchange Club of the British Isles now has a membership of fifty. During the year 373 covers were sent in, 67 containing Rubi, 49 Hieracea, and 14 Euphrasiæ, the total number of specimens received and distributed being 4575. The report contains a large number of notes of new varieties, new localities, and records confirming the persistence of rare species and varieties in previously recorded habitats.

A THESIS recently presented to the Paris Faculty of Science by M. Henri Bénard deals with the cellular distribution of eddies produced in liquid films when convection currents are set up. Although the phenomena herein described have been previously recorded, but little appears to have been done in submitting them to systematic observation. These phenomena

consist in the property that when a horizontal film of liquid has its lower surface heated to a higher temperature than its upper surface, the convection currents divide the liquid into a series of more or less regularly formed hexagonal cells, the liquid flowing down the sides and up the middle. The experiments have been made chiefly with spermaceti, various methods being adopted in order to make the cellular structure visible by the addition of solid particles. The distribution of motion is found to be permanent and stable, and M. Bénard has determined all the geometric, kinematic and dynamic elements of the motion.

Bulletin No. 44 of the Agricultural Department of Madras consists of notes on the domesticated cattle of that Presidency by Mr. J. D. E. Holmes, of the Veterinary Department. The various breeds found in this part of India are recorded and briefly characterised.

A RECENT issue of the *Proceedings* of the U.S. Museum (No. 1228) is devoted to the consideration of the relationships of the jumping-mice to the jerboas on the one hand and to Sminthus on the other. The author, Mr. M. W. Lyon, comes to the conclusion that the first-named animals typify a family (Zapodidæ) by themselves, and that in that family should be included the genus Sminthus, which was referred by Alston to the mice and rats (Muridæ). In No. 1227 of the same publication Mr. D. W. Coquillett discusses the classification of the flies (Diptera).

THE first part of a list of the birds in the Indian Museum, Calcutta, by Mr. F. Finn, has been received. Although this little work is nothing more than a classified list of species (containing in this part the families Corvidæ, Paradiseidæ, Ptilonorhynchidæ, and Crateropodidæ), with a record of the specimens by which each is represented in the Calcutta Museum, it has a considerable value to ornithologists on account of the inclusion of a list of "type" specimens. How extensive must be the series of such types in the Indian Museum may be inferred from the fact that there are no less than sixty-six in the Corvidæ and Crateropodidæ alone. Bearing in mind the liability to damage and decay of almost all natural history specimens in the climate of Lower Bengal, the question must suggest itself to all ornithologists whether it is advisable that such valuable specimens should remain permanently in Calcutta.

OUR American contemporary *Science*, for August 16, contains the report of a lecture on regeneration and liability to injury in animals, delivered by Prof. T. H. Morgan at Columbia University. In this lecture (which forms the first of a series) Prof. Morgan commences by discussing the common belief as to the existence of a definite relation between the liability of an animal to injury and its power of regeneration, and the idea that those parts of an animal most subject to injury are those in which the power of regeneration is most developed. With regard to the latter portion of the popular belief, Prof. Morgan has no hesitation in condemning it as unsound. The fact that in animals with "breaking joints" the regeneration may take place both above and below such joint is, he states, a sufficient demonstration of the falsity of the belief. With regard to the other part of the proposition, Prof. Morgan adduces evidence to show that the power of regeneration is characteristic of groups rather than of species; and that when exceptions do occur it is not in the case of forms specially protected from injury. "If this is borne in mind, as well as the fact that protected and unprotected parts of the same animal regenerate equally well, there is established, I think," says the lecturer, "a strong case in favour of the view that there is no necessary connection between regeneration and liability to injury."

TWO weeks ago announcement was made that the President of the Board of Trade had appointed a committee to inquire and report upon the means by which the State or local authorities could assist scientific research as applied to problems affecting the fisheries of Great Britain and Ireland. It was gratifying to record this sign of interest in the scientific aspects of our fisheries, and the appointment has not been made too early, for we learn, from a letter which Mr. W. Garstang contributes to the *Western Morning News* of August 28, that the Technical Instruction Committee of the Cornwall County Council has curtailed the grant for fishery purposes which it has been giving for the past few years, apparently as a prelude to further restrictions of the work done by the Sub-Committee for Fisheries. Perhaps the appointment of the Board of Trade committee will induce the Cornish authorities to reconsider their recent action, for they should see that the subjects which the committee have to consider are those which their own fishery expert has had under consideration since he began his investigations. Cornwall has in fact been doing what every local authority having fishery interests within its area ought to do; and to limit the scientific work it has instituted would be an unfortunate and altogether unsatisfactory conclusion of an enlightened policy. It is difficult to point to direct benefits received from such work, but the subjects of instruction and experiment carried on under the auspices of the Cornish committee ought to meet with the approval of far-seeing practical men. Our fisheries are declining at a very rapid rate, and scientific advice is needed to show how waste can be reduced and supplies increased. As Mr. Garstang remarks, there is no valid reason why biology, with suitable means and opportunities, may not do as much for our fisheries as chemistry and physics have achieved for our manufactures. "It should not be forgotten that the vast oyster fisheries of France at the present day are to a large extent the outcome of a commission given to a man of science, M. Coste, by the French Government exactly fifty years ago, when 'it is hardly an exaggeration to say there was scarcely an oyster of native growth in France.' Coste successfully introduced the Italian methods of culture into France, and his countrymen modified them to suit the local conditions, though years were spent in the needful preliminary experiments. No one to-day would assert that those years of experiment were ill-spent, although at the time their cost was doubtless greater than their immediate return."

"BRITISH RAINFALL" (for 1900) appears for the first time without the name of the late Mr. Symons, the editors of the rainfall records now being Mr. H. Sowerby Wallis and Dr. H. R. Mill. The subjects of special contributions to the new volume are the Ilkley flood of July 1900, and the development of rainfall measurement in the last forty years. In the latter article Dr. Mill gives an interesting account of the various kinds of rain-gauges which have been used, and states some of the general results obtained. Copper is generally adopted as the material for rain-gauges because it is not affected much by weather, its surface is smooth, and it is not easily broken. Ebonite is better, but it is more costly; zinc, though cheaper, deteriorates in the neighbourhood of towns or manufacturing districts. Dr. Mill suggests, however, that it might be possible to find a suitable substitute for copper among such substances as pure nickel, enamelled iron, and celluloid, with modern enamel paints. The size of the rain-gauge is immaterial, and the 5-inch gauge has been adopted as the standard because it does not collect an embarrassingly large or inconveniently small volume of water for measuring. The exposure and elevation of rain-gauges have formed the subjects of many experiments and reports, and Dr. Mill thus sums up the observations:—"The outcome of the whole matter is, that over a broad, flat surface, whether a natural feature of the ground like a plain, a plateau or flat-topped hill, or an artificial erection like a very extensive flat roof, increase of height produces no diminution in the amount of rain caught by a gauge having its mouth one foot

above the surface on which it rests. But any abrupt change in the slope of the surface near the gauge, whether it be an embankment across a valley, a cliff, or a steep roof, or tower, allows the wind to set up eddies, or acquire an increased velocity, and so to reduce the amount of rain received in a horizontal gauge." These principles are clear enough, and they show the need for the adoption of a uniform height of gauge by all members of the rainfall organisation. At present it appears that not half the gauges in use are placed at exactly the standard height.

MESSRS. SWAN SONNENSCHEIN AND CO. have published a third and revised edition of "Land and Fresh-water Shells," by Mr. J. W. Williams, with a chapter on the distribution of the British land and fresh-water Mollusca, by Mr. J. W. Taylor and Mr. W. Denison Roebuck.

THE additions to the Zoological Society's Gardens during the past week include a Sooty Mangabey (*Cercocebus fuliginosus*) from West Africa, presented by Mr. G. Nicholson; a Rhesus Monkey (*Macacus rhesus*, ♀) from India, presented by Mr. J. McCarthy; a Short-toed Eagle (*Circaëtus gallicus*) from the Atlas Mountains, presented by Captain W. R. Taylor; a Passerine Parrot (*Psittacula passerina*) from South America, presented by Mr. W. C. Stronge; two Turtle Doves (*Turtur communis*), British, presented by Miss L. Cox; a Greek Tortoise (*Testudo graeca*) from South Europe, presented by Mr. Balfour Read; a Neumann's Baboon (*Cynocephalus neumanni*) from Central Africa, a Nisnas Monkey (*Cercopithecus pyrrhonotus*) from East Africa, a Striped Hyæna (*Hyaena striata*, var.) from North Africa, three Pale Fennec Foxes (*Canis pallidus*) from the Soudan; a Brazilian Caracara (*Polyborus brasiliensis*) from South America, a Black-headed Conure (*Conurus nanday*) from Paraguay, an Egyptian Monitor (*Varianus niloticus*) from North Africa, two Brazilian Tortoises (*Testudo tabulata*) from South America, two Sculptured Terrapins (*Clemmys insculpta*) from North America, three Muhlenberg's Terrapins (*Clemmys muhlenbergi*) from North America, a Pennsylvania Mud Terrapin (*Cinosternum pennsylvanicum*) from North America, three Laughing Kingfishers (*Dacelo gigantea*) from Australia, two White-capped Tanagers (*Stephanophorus leucocephalus*) from Argentina, three Striated Tanagers *Tanagra striata*) from Buenos Ayres, four Palm Tanagers (*Tanagra palmarium*) from South America, a King Snake (*Coronella getula*) from North America, two Ocellated Sand Skinks (*Chalcides ocellatus*) from North Africa, deposited; four Lesser Snow Geese (*Chen nivalis*) from North America, two Mute Swans (*Cygnus olor*), European, purchased; a Thar (*Hemitragus jemlaicus*), born in the Gardens.

OUR ASTRONOMICAL COLUMN.

SPECTRUM OF NOVA PERSEI.—A communication from Prof. Pickering to the *Astronomische Nachrichten* (Bd. 156, No. 3735) gives particulars of the examination of recent photographs of the spectrum of the Nova taken at the Harvard College Observatory. The reductions show that, as has been the case in previous Novæ, the object has been gradually changing into a gaseous nebula. The resemblance to the nebula N.G.C. 3918 was so close on June 20 that no marked difference in the two spectra was noticeable. The main point of divergence is in the relative intensity of the chief nebular line at λ5007, which in N.G.C. 3918 is about eight times as bright as Hβ, while in the Nova these two lines are about equal in intensity.

The following lines are common to both bodies:—

3869	4688
3970, Hε	4862, Hβ
4102, Hδ	4959
4341, Hγ	5007

and with the above-mentioned exception of λ5007 are of similar intensity. Four bright lines between Hγ and Hβ appear faintly in the Nova, and are not present in the nebula, while one, at λ4364, is seen in the nebula, but not in the Nova, perhaps owing to the proximity of Hγ.

NEW DOUBLE STARS.—*Bulletin* No. 3, from the Lick Observatory, contains a list of 94 new double stars discovered by Mr. R. G. Aitken, with the 12-inch and 36-inch telescopes, the majority of the measures being obtained with the larger instrument. The series has been compared with Prof. Burnham's Catalogue to ensure the absence of duplicate records of previous discoveries. Classified according to distance of their components the 94 pairs show the following grouping:—

Under 0".25	3
0".50	23
1".00	47
2".00	73
Over 5".00	1

SIX STARS WITH VARIABLE RADIAL VELOCITY.—Prof. W. W. Campbell gives particulars in *Bulletin* No. 4 of the Lick Observatory of six additional spectroscopic binaries, of which variable velocity in the line of sight has been determined from spectra obtained with the Mills spectrograph of the Lick Observatory. The details of the measures are given below:—

Star.	Extreme velocities (kilometres).	
π Cephei	−37	−5
$o_1$31 Cygni	−12	+3
ξ Piscium	+25	+35
τ Persei	+10	−4
$ξ_1$ Ceti	−9	+4
ε Hydræ	+43	+32

CAUSES OF THE VARIABILITY OF EARTHSHINE.—In the May number of the U.S. *Monthly Weather Review*, Mr. H. H. Kimball gives an interesting discussion of the probable causes of the earthshine observed on the moon's shadow side some few days previous to, and following new moon. With the idea that the amount of light reflected from the earth to the moon will vary considerably according to the condition of the earth's surface and atmosphere, a special projection chart of the earth has been prepared, showing the configuration of the continents, oceans, &c., and general atmospheric conditions (clouds, &c.), on a certain evening when the earthshine was specially prominent. If the bright portion is snow-covered, it will reflect more than a continent of forest and vegetation, and much more than a large extent of water.

A factor of considerable importance is the varying distance of the moon, and it is stated that 52 per cent. of the change in intensity of the earthshine is due to the eccentricity of the moon's orbit, and this is probably much greater than could be expected from any increase or diminution in the average cloudiness over the hemisphere of the earth reflecting light to the moon.

SOLAR RADIATION.

SOLAR radiation is a subject which has more than scientific interest. It is the source of all the energy which maintains the economy of our globe. It lights and heats the other members of the planetary system. But, after accomplishing this, only an infinitesimal proportion of the total radiation has been used. The remainder, in so far as we know, is wasted by uninterrupted dissipation into space.

The subject can be regarded and studied from either the solar or the terrestrial point of view. In terrestrial physics everything may be said to depend on the energy which, in one form or another, is supplied by the sun's rays. It is the revenue of the world, and it is of fundamental importance for us to know at what rate it falls to be received.

Roughly speaking, the surface of the earth is occupied to the extent of one-fourth by land and three-fourths by sea. Therefore at least three-fourths of the surface which the earth presents to the sun is at the sea-level. Consequently the rate at which the sun's radiant heat arrives at the sea-level is the fact which it is of the greatest economical importance to ascertain.

In considering this problem we have to answer two questions: What is the best experimental method of determining the heating power of the sun's rays at any place? and What is the best locality for making the experiment? Let us take the last first. The energy which a radiation communicates to a surface